

### REMARKS

Claims 1-3, 5-14, 16-21, and 23-26 are pending. New claims 24-26 have been added. Support for the new claims may be found throughout the specification (see, e.g., Examples and page 29, lines 3-7 of the specification).

#### **Obviousness-type double patenting rejection**

The Examiner rejected claims 1-3, 5-14, 16-21 and 23 on the ground of obviousness-type double patenting over claims 1-24 of U.S. Patent No. 7,181,266 (see page 2 of the Office Action). The Examiner stated that applicants' arguments were not understood and that the fact that a terminal disclaimer was filed in a related application does not affect the requirement of filing a terminal disclaimer in the present application (see page 2 of the Office Action and Advisory Action). As explained before, a terminal disclaimer was not filed in any related application. Indeed, it was filed in U.S. Patent No. 7,181,266 which is the basis of the obviousness-type double patenting rejection. The terminal disclaimer was accepted in U.S. Patent No. 7,181,266 and applies to this application, rendering this rejection moot. Applicants respectfully request reconsideration and withdrawal of this ground of rejection.

#### **Rejections under 35 U.S.C. § 102(b)**

##### Barbera-Guillem

The Examiner rejected claims 1-2, 6-8, 13, 14 and 16-21 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,333,110 to Barbera-Guillem et al. ("Barbera-Guillem") (see page 3 of the Office Action). The Examiner states that Barbera-Guillem discloses an emission wavelength range above 700 nm and that wavelengths above 700 nm are in the infrared wavelength range (see Advisory Action). Applicants respectfully disagree. Claims 1 and 13 are independent.

Claim 1 relates to an imaging composition including a semiconductor nanocrystal having an outer layer bonded to the nanocrystal, wherein the nanocrystal emits light in the near-infrared or infrared wavelength regions. Claim 13 relates to a method of imaging tissue including introducing a composition including a semiconductor nanocrystal into the tissue; and detecting

emission from the semiconductor nanocrystal, wherein the emission is in the near-infrared or infrared wavelength regions.

Barbera-Guillem does not describe an imaging composition including a nanocrystal that emits in the near-infrared or infrared wavelength regions. Barbera-Guillem broadly discloses a range of 400 nm to 750 nm for the emission spectrum, which is the range of visible light (see, e.g., Barbera-Guillem at column 3, lines 60-61). In addition, all the examples of emission wavelengths disclosed are well within the visible spectrum (see, e.g., Barbera-Guillem at column 15, line 50 to column 16, line 4 (disclosing fluorescence peaks at 609 nm (orange), 545 nm (yellow), 522 nm (green), and 480 nm (blue)); at column 19, lines 49-55 (disclosing fluorescence peaks at 557 nm and 662 nm)).

The Examiner failed to address applicants' argument that even though applicants' claimed wavelength and the range disclosed in Barbera-Guillem may overlap, patentability is not automatically foreclosed. MPEP § 2131.03(II) provides that:

When the prior art discloses a range which touches or overlaps the claimed range, but no specific examples falling within the claimed range are disclosed, a case by case determination must be made as to anticipation. In order to anticipate the claims, the claimed subject matter must be disclosed in the reference with "sufficient specificity to constitute an anticipation under the statute." What constitutes a "sufficient specificity" is fact dependent. If the claims are directed to a narrow range, and the reference teaches a broad range, depending on the other facts of the case, it may be reasonable to conclude that the narrow range is not disclosed with "sufficient specificity" to constitute an anticipation of the claims. See, e.g., *Atofina v. Great Lakes Chem. Corp.*, 441 F.3d 991, 999, 78 USPQ2d 1417, 1423 (Fed. Cir. 2006) wherein the court held that a reference temperature range of 100-500 degrees C did not describe the claimed range of 330-450 degrees C with sufficient specificity to be anticipatory. Further, while there was a slight overlap between the reference's preferred range (150-350 degrees C) and the claimed range, that overlap was not sufficient for anticipation. "[T]he disclosure of a range is no more a disclosure of the end points of the range than it is each of the intermediate points." *Id.* at 1000, 78 USPQ2d at 1424. Any evidence of unexpected results within the narrow range may also render the claims unobvious. The question of "sufficient specificity" is similar to that of "clearly envisaging" a species from a generic teaching.

In this case, Barbera-Guillem discloses a broad range of 400 nm -750 nm but does not specifically disclose a nanocrystal that emits in the near-infrared or infrared wavelength regions. In addition, Barbera-Guillem says nothing about how to make a nanocrystal that emits in the near-infrared or infrared wavelength regions. One may not clearly envisage from Barbera-

Guillem a nanocrystal that emits in the near-infrared or infrared wavelength regions in the imaging composition of claims 1 or 13.

Thus, Barbera-Guillem does not disclose all the limitations of claim 1 or 13. Accordingly, claims 1 and 13, and the claims which depend therefrom are not anticipated by Barbera-Guillem. Applicants respectfully request reconsideration and withdrawal of this ground of rejection.

### **Rejections under 35 U.S.C. § 103(a)**

#### **Barbera-Guillem in view of Bawendi**

The Examiner rejected claim 3 under 35 U.S.C. § 103(a) as being obvious over Barbera-Guillem in view of U.S. Patent Publication No. 2001/0040232 to Bawendi et al. ("Bawendi") (see page 3 of the Office Action). Claim 3 depends from independent claim 1. Applicants respectfully disagree.

Claim 1 relates to an imaging composition including a semiconductor nanocrystal having an outer layer bonded to the nanocrystal, wherein the nanocrystal emits light in the near-infrared or infrared wavelength regions. As discussed above, Barbera-Guillem does not disclose an imaging composition including a nanocrystal that emits in the near-infrared or infrared wavelength regions. Bawendi does not remedy this defect. There is no disclosure in Bawendi of a nanocrystal emitting in the near-infrared or infrared wavelength regions. The nanocrystals exemplified in Bawendi emit at wavelengths between 470 nm and 650 nm (see, e.g., Bawendi at paragraph 93 (describing overcoated (CdSe)ZnS nanocrystals emitting at 500 nm and 542 nm) and claims 36 and 42 (relating to a water-soluble nanocrystal emitting between 470 nm and 650 nm)).

Thus, Barbera-Guillem and Bawendi do not disclose all the limitations of claim 1. Accordingly, claim 1 and the claims which depend therefrom are not obvious over Barbera-Guillem in view of Bawendi. Applicants respectfully request reconsideration and withdrawal of this ground of rejection.

#### **Barbera-Guillem in view of Bryant**

The Examiner rejected claims 5, 9-12, and 23 under 35 U.S.C. § 103(a) as being

unpatentable over Barbera-Guillem in view of Bryant et al., "Designing quantum dots and quantum-dot solids," *Physica E* **2001**, 11, 72-77 ("Bryant") (see pages 4-5 of the Office Action). Applicants respectfully disagree. Claim 5 and 9-12 depend from independent claim 1. Claim 23 depends from independent claim 13.

Each of claims 1 and 13 relates to a composition or a method including a nanocrystal that emits in the near-infrared or infrared wavelength regions. As discussed above, Barbera-Guillem does not disclose a nanocrystal that emits in the near-infrared or infrared wavelength regions. Indeed, based on the exemplified compositions, Barbera-Guillem does not teach or suggest nanocrystals emitting in the near-infrared or infrared wavelength regions either. Moreover, Barbera-Guillem does not teach or suggest of imaging tissue including introducing a composition including a semiconductor nanocrystal into the tissue; and detecting emission from the semiconductor nanocrystal, wherein the emission is in the near-infrared or infrared wavelength regions. Bryant does not remedy this defect. Bryant describes optical absorption spectra for quantum-dot quantum-well barrier/well/barrier nanocrystals. There is no teaching or suggestion in Bryant of a nanocrystal emitting in the near-infrared or infrared wavelength regions. Thus, neither Barbera-Guillem, Bryant, nor their combination teaches or suggests all the limitations of claim 1 or 13. Accordingly, claims 1 and 13, and the claims which depend therefrom are patentable over Barbera-Guillem in view of Bryant.

The Examiner has failed to address applicants' arguments in connection with dependent claims 5 and 23. Applicants argued that claims 5 and 23 are further patentable because they describe a composition or a method including a nanocrystal including a core of a first semiconductor material and an overcoating of a second semiconductor material on the core wherein the first semiconductor material and the second semiconductor material are selected so that, upon excitation, one carrier is substantially confined to the core and the other carrier is substantially confined to the overcoating. Neither Barbera-Guillem nor Bryant teaches or suggests a nanocrystal wherein, upon excitation, one carrier is substantially confined to the core and the other carrier is substantially confined to the overcoating. The Examiner previously argued that Bryant teaches a nanocrystal in which "the shell can act as an electron and hole trap" (see page 5 of the office action of April 4, 2007), which is distinct from the subject matter of claims 5 and 23. Bryant does not teach or suggest that one carrier is substantially confined to the

core and the other carrier is substantially confined to the overcoating; in Bryant, both carriers, the electron and the hole, are confined in the shell. Thus, neither Barbera-Guillem, Bryant, nor their combination teaches or suggests all the limitations of claim 5 or 23. Accordingly, claims 5 and 23 are patentable over Barbera-Guillem in view of Bryant.

Applicants respectfully request reconsideration and withdrawal of this ground of rejection.

### **New Claims**

Claims 24 and 25 are further patentable because, as discussed above and as acknowledged by the Examiner, Barbera-Guillem does not describe a semiconductor nanocrystal having a peak emission at 752 nm or more.

Claim 26 is further patentable because Barbera-Guillem does not describe the use of broadband white light of 400 to 700 nm. Barbera-Guillem discloses that the light source suitable for exciting the multiple species of functionalized nanocrystals may comprise a spectrum (visible, or UV, or a combination thereof) and that a preferred excitation spectrum for this purpose, is in the range of about 300 nm to about 400 nm. Thus, nothing in Barbera-Guillem indicates the use of broadband white light of 400 to 700 nm.

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Serial No. : 10/772,424  
Filed : February 6, 2004  
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CONCLUSION

In light of the foregoing amendments and remarks, Applicants respectfully ask that all claims be allowed. Please apply any charges or credits to deposit account 19-4293.

Respectfully submitted,

Date: March 10, 2008

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